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Recall and Effectiveness of Messages Promoting Smoke-Free Policies in Rural Communities

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Abstract

Introduction: Low-cost media campaigns increase demand for smoke-free policies in underserved rural areas. The study examined the impact of loss- and gain-framed smoke-free print ads on recall and perceived effectiveness in rural communities, controlling for personal characteristics.

Methods: Following 6- to 9-month print media campaigns in three rural counties, recall and perceived effectiveness of loss-framed (ie, targeting dangers of secondhand smoke [SHS]) and gain-framed (ie, highlighting positive aspects of smoke-free air) ads were assessed using random-digit-dial phone surveys. Respondents were asked if they remembered each ad, whether they liked it, whether they were prompted to contact a smoke-free coalition, whether the ad made them think, and whether it prompted emotion. Mixed modeling assessed whether personal factors predicted ad recall or perceived effectiveness.

Results: Loss-framed ads were less likely to be recalled but more likely to prompt emotion. For ads of both frame types, females reported greater recall and perceived effectiveness than males. Those with less education reported higher perceived effectiveness of the ads but lower recall. Nonsmokers were more likely than smokers to perceive the ads as effective. Knowledge of SHS risk and support for smoke-free workplaces were positively associated with recall and effectiveness.

Conclusions: Ad recall and perceived effectiveness were associated with framing and demographic and personal characteristics. Smoke-free efforts in rural areas may be bolstered by continuing to promote benefits of smoke-free workplace policies and educate on SHS risks. Rural areas may need to provide a combination of ad types and framing strategies to appeal to a wide audience.

Implications: Rural communities are disproportionately affected by SHS and less likely to be protected by smoke-free policies. This study adds evidence-based guidance for tailoring rural smoke-free media campaigns using different framing: gain-framed messages (ie, benefits of smoke-free environments) to promote recall and loss-framed content (ie, dangers of SHS) to prompt emotion. Further, gain-framed messages that are localized to the rural community may be especially effective. Findings support designing smoke-free campaigns in rural communities with the audience in mind by tailoring messages to age, sex, and education level.

Introduction

Rural populations are more likely than their urban counterparts to use tobacco and suffer secondhand smoke (SHS) exposure,[1] despite an upsurge in smoke-free legislation.[2] Rural communities are often targeted by tobacco industry marketing campaigns via various media channels and cultural events. Further, some rural communities have longstanding ties to tobacco growing.[1] Rural, tobacco-growing regions of the United States often have fewer resources, tobacco-related laws, and antismoking programs.[1,3] In addition, antitobacco media campaigns are often less effective among socioeconomically disadvantaged populations,[4] such as those living in rural communities. Little is known about how to best reach rural residents with effective messaging to promote smoke-free policy. Evaluating print media is of particular interest in this context, since print ads are a low-cost way of reaching rural residents while other media channels, particularly television, may be cost prohibitive.[5]

Building demand through media campaigns promotes policy change.[6–8] In 2007, our team launched a 5-year "Rural Smoke-free Communities Project" to test the effects of a stage-specific, tailored policy development intervention on community readiness and policy outcomes.[7] One of the key elements was the use of low-cost media campaigns to build support for smoke-free policy, in part, through evidence-based message framing.

The way a media message is framed can determine how effective it is in promoting behavior change. Loss-framed messages focus on the disadvantages or costs of noncompliance with a recommendation, while gain-framed messages focus on the advantages or benefits of performing a recommended behavior.[9] One type of message frame may be more effective than another, but may convey identical information.[10] Ads in rural areas depicting risks associated with SHS exposure (loss-framed) were instrumental in promoting smoke-free policies, and humorous, entertaining ads were viewed as less effective than serious ones.[11] Similarly, another study reported that loss-framed messages are more effective in increasing attention to and recall of antitobacco advertisements.[12] Gain-framed messages may be more effective in promoting health behaviors,[13] such as improving diet or exercise, while loss framing may be more effective for certain detection interventions, such as screening for chronic disease.[14] Research on the use of loss- and gain-framed message framing is sparse and contradictory.[11]

The study purpose was to examine the impact of loss-framed (ie, dangers of SHS) and gain-framed (ie, positive aspects of smoke-free air) smoke-free print ads on recall and perceived effectiveness in rural Kentucky communities, controlling for demographic and personal characteristics. If survey participants recalled the ads, they were asked whether they liked them, how likely the ads were to prompt action for smoke-free efforts, and the degree to which they prompted thought or evoked emotion. We hypothesized that framing would be associated with recall and perceived ad effectiveness.

Methods

Design and Sample

The post-test only quasi-experimental study involved random-digit-dial population-based surveys following low-cost print media campaigns in each of three rural counties. These counties were part of the intervention group for the larger Rural Smoke-free Communities Project to assess the impact of a stage-specific, tailored community-based policy development intervention to promote smoke-free public policies.[7] The three counties were purposively selected from the 22-county intervention group in the larger study based on the timing and intensity of their print media campaigns. In particular, they were chosen because their ad campaigns coincided with the study timeframe, and they chose evidence-based ads from a prior sub-study of the Rural Smoke-free Project.[7,11] The selected counties had Rural–Urban Continuum (RUC) code values of 6 or greater, indicating non-metro counties with small urban or completely rural populations.[15] In total, 1518 participants completed the phone surveys (504, 502, and 512 in Counties A, B, and C). CASRO response rates[16] were 40.8%, 38.4%, and 46.3%, respectively.

Print Media Campaigns

The three counties each ran low-cost print media campaigns starting in November 2010 to January 2011 and lasting 6 to 9 months. Local coalition members selected the specific ads and media channels, guided, in part, by Rural Smoke-free Communities Project Community Advisors, who provided technical assistance for the larger study.[7] The ad campaigns were financed, in part, by annual $2500 mini-grants provided by the Rural Smoke-free Communities Project. Counties A and B used $2200 (88%) and $2050 (82%), respectively, of their FY 11–12 mini-grant awards to fund ads for the study reported here. In addition, County B used $1720 (69%) of their FY 10–11 mini-grant for media advertising, and a portion of this may have been used for the media campaign in this study. County C covered advertising costs from unrelated funding sources. A total of 21 print advertisements ran (9, 7, and 5 in Counties A, B, and C, respectively). Media channels included direct-mail postcards (13 ads), newspaper advertisements (5), billboards (5), and posters displayed in local businesses (3); five of the ads appeared in more than one media channel. The ads were categorized as loss- or gain-framed post-media campaign by six study personnel with tobacco control expertise. Among the 21 ads, 13 were classified as loss-framed and 8 were gain-framed. Each of the county campaigns used 3–5 loss-framed ads.

Ads were developed and disseminated using message content strategies and media channels previously identified as effective with rural populations (Supplementary Appendix).[11,17] The ads used in this study were chosen from a group of sample ads and based on feedback from focus groups in rural Kentucky counties.[11] Many ads featured the use of local data, personal stories, and pictures of local citizens. Although there were both loss- and gain-framed messages, none of them were humorous or light-hearted in delivery, and none focused blame on smokers, as those are less effective in promoting smoke-free policy in rural communities.[11]

Survey Procedure

Following the media campaigns in each county, random-digit-dial surveys were conducted. Households were selected using a modified list-assisted Waksberg-Mitofsky random-digit-dial procedure, ensuring every residential telephone line in the county had an equal probability of contact. Up to 15 attempts were made to each number in the sample. In addition, up to 10 scheduled call-backs and one refusal conversion were attempted. The calls were completed between August and October 2011 for Counties A and C, and between July and August 2011 for County B.

Measures

Demographic Characteristics and Smoking Status

The survey assessed age, gender (male vs. female), race (white vs. Other), and education (less than high school vs. high school or above). Current smoking status was determined by: (1) "Have you

smoked at least 100 cigarettes in your entire life?" (yes/no); and (2) "When was the last time you smoked a cigarette?" ("Never smoked," "Today," "1–7 days ago," "8–29 days ago," "1–3 months ago," "4–6 months ago," "7–11 months ago," "1–4 years ago," and "5 or more years ago"). Current smokers had smoked at least 100 cigarettes in their lifetime, and had smoked within the last 29 days.

County-level demographic indicators included race,[18] educational attainment (percent adult population with at least a high school diploma),[19] adult smoking rate,[20] and population size.[19]

Ad Outcomes

For each print ad, residents were asked if they were exposed to the ad and their opinions of its effectiveness. For each of the five ad outcomes for a given ad (ie, "Recall," "Like," "Action," "Think," and "Emotion"), respondents were assigned 1 point if they agreed and 0 if they disagreed. This common scoring algorithm allowed for analogous comparisons across all five ad outcome measures.

Following a prompt describing the ad, respondents were asked "Do you remember seeing this advertisement?" (ie, Recall). If no, they received a score of 0 for Recall. If yes, they were assigned 1 point for Recall, and then asked their opinions of the ad: (1) "Did you like this ad?" (ie, Like) ("A lot" to "A little," and "Not at all"). Those indicating they liked the ad "A lot" or "A little" were assigned 1 point for Like; those replying "Not at all" received a 0; and (2) "Would the ad prompt you to contact the local smoke-free coalition?" (ie, Action) (yes/no).

If participants recalled the ad, two additional outcomes were assessed including "To what extent do you agree or disagree with the following statement:" "The ad really made me think," (ie, Think) and "The ad really affected me emotionally" (ie, Emotion) ("Strongly disagree," "Somewhat disagree," "Somewhat agree," and "Strongly agree"). These items were from the Transportation Scale[21] that has been tested and validated to measure perceived effectiveness of print and broadcast advertisements.[22,23] Respondents were assigned 1 point for agreement and 0 if they disagreed. Consistent with prior research using these scale items, the response option was intended to measure intensity of thought or emotional response rather than direction (ie, positive or negative). Respondents who did not recall a particular ad were not asked their opinions about the ad, including Like, Action, Think, and Emotion.

Knowledge of SHS Exposure Risk

Knowledge was assessed using a 4-item instrument.[24] These items included "Inhaling someone else's smoke can cause lung cancer in nonsmokers," "Inhaling someone else's smoke can cause heart disease in nonsmokers," "It is harmful to a person's health if they live in a house where people smoke tobacco indoors," and "Smoking cigarettes around a baby increases the chance they will die of sudden infant death syndrome." Each item was scored by assigning one point for each "Agree" or "Strongly agree" response. The knowledge score was determined by adding the number of correct responses ranging from 0 to 4; higher scores indicate greater knowledge. Kuder-Richardson 20 reliability was 0.81.

Support for Smoke-Free Workplaces

Support for smoke-free policies was assessed with: "Would you say that you would strongly support, somewhat support, somewhat oppose, or strongly oppose a smoke-free workplace law or regulation in your community?" Responses ranged from 1 to 4; higher scores reflected greater support.

Data Summary and Analysis

Once all ad outcomes had been coded, a summary score for each outcome (Recall, Like, Action, Think, and Emotion) and particular frame was created by calculating the percent of positive responses across all ads for each person. For example, respondents from County A were asked about nine ads (three loss-framed; six gain-framed). Recall of loss-framed ads was the percent of ads recalled from the three ads in this category; for gain-framed ads, it was the percent of ads recalled from the six in that category. Each ad outcome ranged from 0 to 100, with higher scores indicating a greater percentage of positive responses.

Descriptive analysis included means and standard deviations or frequency distributions. Comparisons of demographic and personal variables across the county groups were done using one-way analysis of variance or the chi-square test of association. The summary statistics for race in each county were included for descriptive purposes only; it was not possible to compare counties statistically on this attribute due to small cell counts for minority residents in these areas. Comparison of ad outcomes between frame types, and determination of demographic/personal factors predicting outcomes were accomplished using linear mixed modeling, with observations nested within counties. Prediction models included age, gender, education, smoking status, knowledge of SHS exposure risk, and support for smoke-free workplace policies as independent variables. Race was not included in these models; small cell counts in the minority category resulted in relative standard errors for the race estimates exceeding 30%, an indication of statistically unreliable estimation.[25] Variance inflation factors were used to check for multicollinearity. Bivariate comparisons and mixed models were weighted by gender to adjust for the overrepresentation of women. Data analysis was conducted using SAS; an alpha level of 0.05 was used.

Results

There were bivariate differences among the three counties on age, educational attainment, and knowledge of SHS exposure risk; but not on gender, smoking status, or support for smoke-free workplaces (Table 1). County B participants were older than those from the other counties, while those from County C were more likely to have completed high school or post-secondary education and to have greater knowledge of SHS exposure risk, compared to those from Counties A and B. The average age of the 1518 respondents was 57 years, ranging from 18 to 97. Most participants were female (70%) and white (96%), and the majority had a high school diploma or beyond (86%) and were nonsmokers (79%). The race distribution of this sample was similar to the weighted population estimates across these three counties (namely 94% white[18]), while the percent with at least a high school diploma was somewhat higher than the population-weighted estimate for Counties A, B, and C combined (67%).[19] The percent of nonsmokers in the sample was similar to the weighted population estimate for these three counties (79%).[20] Of a maximum possible score of 4, both knowledge of SHS exposure risk and support for smoke-free workplaces averaged 3.2.

Comparisons of Ad Outcomes Between Loss- and Gain-Framed Messages

The average percent of loss-framed ads recalled was significantly less than the percent of gain-framed ads (20% vs. 29%; $P < .001$). Respondents reported that more loss-framed ads (68%) had emotional impact compared to gain-framed ads (58%; $P = .001$). There were no

Table 1. Demographic Characteristics of Study Participants, With Gender-Weighted Comparisons Among County Groups

	Total sample, $N = 1518$	County			
		A ($n = 504$)	B ($n = 502$)	C ($n = 512$)	
Variable	Mean (*SD*); range or *n*; %	Mean (*SD*); range or *n*; %	Mean (*SD*); range or *n*; %	Mean (*SD*); range or *n*; %	*P*[a]
Age	57.3 (15.3); 18–97	56.3 (14.9); 18–94	60.2 (15.2); 18–97	55.6 (15.4); 18–94	<.001
Gender					.91
Male	450; 29.7%	139; 27.6%	140; 28.0%	171; 33.5%	
Female	1064; 70.3%	365; 72.4%	360; 72.0%	339; 66.5%	
Race[b]					—
White	1422; 95.6%	472; 95.6%	467; 94.7%	483; 96.4%	
Other	66; 4.4%	22; 4.4%	26; 5.3%	18; 3.6%	
Education					.011
≥High school	1282; 85.5%	413; 82.8%	416; 83.9%	453; 89.9%	
<High school	217; 14.5%	86; 17.2%	80; 16.1%	51; 10.1%	
Smoking status					.13
Smoker	313; 20.9%	118; 23.8%	95; 19.1%	100; 19.8%	
Nonsmoker	1184; 79.1%	378; 76.2%	402; 80.9%	404; 80.2%	
Knowledge of SHS exposure risk	3.19 (1.26); 0–4	3.11 (1.34); 0–4	3.18 (1.28); 0–4	3.26 (1.16); 0–4	.02
Support for SF workplace policy	3.21 (1.08); 1–4	3.16 (1.08); 1–4	3.20 (1.14); 1–4	3.28 (1.01); 1–4	.12

SHS = secondhand smoke; SF = smoke-free.

[a]*P* from weighted one-way analysis of variance or chi-square test of association, as appropriate.

[b]No group comparison due to small cell counts for minority race category.

framing differences in: (1) liking the ads ($P = .49$); (2) being prompted to contact a smoke-free coalition ($P = .065$); or (3) the ad making them think ($P = .11$). Across the two framing types, 88% liked the ads, 31% said they prompted action, and 83% said ads made them think.

Predictors of Ad Outcomes by Framing Type

Recall

Percent of loss-framed ads recalled was associated with gender (males recalled 4.5% fewer ads than females) and knowledge of SHS exposure risk (2.1% increase in percent recalled for every 1-point increase in knowledge; Table 2). Percent of gain-framed ads recalled was predicted by age (a nearly 2% decrease in percent recalled for every decade increase in age) and education (those with less than high school education recalled 11.1% fewer ads).

Like

Percent of loss-framed ads liked was associated with gender (males liked nearly 6% fewer than females), knowledge of SHS exposure risk, and support for smoke-free workplace policies (8.4% more ads liked for each 1-point increase in knowledge and 11.3% more ads liked for each 1-point increase in support). Percent of gain-framed ads liked was 11.1% lower for smokers than nonsmokers. For gain-framed ads, a 1-point increase in knowledge of SHS risk was associated with an 8.3% increase in the percent of ads liked; and a 1-point increase in support for smoke-free workplaces predicted a 12.2% increase in the percent of ads liked.

Action

Percent of loss-framed ads spurring action was predicted by gender (males indicated 7.1% fewer ads prompted action), education (those with less than high school reported 16.1% more ads prompted action), knowledge (1-point increase in knowledge associated with 3.6% increase in percent of ads that prompted action), and support for SF policies (1-point increase in support associated with 4.1% increase in percent ads spurring action). For gain-framed ads, action was predicted by gender (males reported nearly 10% fewer ads prompting action) and knowledge (1-point increase in knowledge associated with 4.4% increase in percent of ads prompting action).

Think

Thinking in response to loss-framed ads was predicted by education (those with less than high school indicated 8.5% more ads made them think), smoking status (smokers indicated 10.4% fewer ads made them think), and knowledge and support (1-point increases predicted 10.8% and 6.4% greater percentages of loss-framed ads making them think, respectively). For gain-framed ads, males indicated that 7.6% fewer ads prompted them to think and smokers indicated 8.1% fewer ads prompted thought. Increased knowledge and support were predictive of a larger percentage of ads spurring thought; for each 1-point increase in these, the increase in the percentage of thought-provoking gain-frame ads was 9.3% and 9.2%, respectively.

Emotion

The percent of loss-framed ads that made the respondent feel emotion was predicted by education, knowledge of SHS exposure risk, and support for smoke-free workplace policies. Those with less than high school education indicated 12.6% more loss-framed ads prompted emotion, compared to more educated participants. For 1-point increases in knowledge and support, the percent of loss-framed ads causing emotion increased by 8.1% and 8.2%, respectively. The percent of gain-framed ads that caused emotion was predicted by gender (males reported 13.7% fewer ads caused emotion), knowledge and support (1-point increases in knowledge and support were predictive of 6.2% and 8.9% increases in percent of ads prompting emotion). All variance inflation factors in the regression models were less than 1.6, suggesting that multicollinearity did influence regression estimates.

Table 2. Linear Mixed Models to Determine the Variables Associated With the Five Ad Outcomes for Each Type of Message Frame, With Gender Weights

	Recall		Like		Action		Think		Emotion	
Variable	Loss (n = 1393)	Gain (n = 915)	Loss (n = 655)	Gain (n = 506)	Loss (n = 671)	Gain (n = 507)	Loss (n = 655)	Gain (n = 504)	Loss (n = 668)	Gain (n = 508)
Age	−0.04 (NS)	−0.17 (.020)	0.08 (NS)	0.06 (NS)	<0.01 (NS)	−0.06 (NS)	0.02 (NS)	0.06 (NS)	0.02 (NS)	<0.01 (NS)
Gender										
Male	−4.51 (.001)	1.88 (NS)	−5.86 (.004)	−3.77 (NS)	−7.08 (.034)	−9.79 (.011)	−2.41 (NS)	−7.63 (.004)	−3.27 (NS)	−13.66 (<.001)
Female	**ref**	ref	**ref**	ref	**ref**	ref	ref	**ref**	ref	**ref**
Education										
<High school	0.40 (NS)	−11.11 (<.001)	3.58 (NS)	1.66 (NS)	16.06 (.002)	9.60 (NS)	8.53 (.023)	−0.79 (NS)	12.57 (.010)	11.33 (NS)
≥High school	ref	**ref**	ref	ref	**ref**	ref	**ref**	ref	**ref**	ref
Smoking status										
Smoker	−1.56 (NS)	−3.97 (NS)	−3.53 (NS)	−11.11 (<.001)	−3.12 (NS)	−9.29 (NS)	−10.40 (.005)	−8.10 (.024)	−3.76 (NS)	−4.60 (NS)
Nonsmoker	ref	ref	ref	**ref**	ref	ref	**ref**	**ref**	ref	ref
Knowledge of SHS exposure risks	2.13 (.002)	1.50 (NS)	8.43 (<.001)	8.32 (<.001)	3.57 (.030)*	4.38 (.018)	10.82 (<.001)	9.32 (<.001)	8.13 (<.001)	6.17 (<.001)
Support for SF workplace policy	0.87 (NS)	1.66 (NS)	11.30 (<.001)	12.16 (<.001)	4.09 (.028)	1.26 (.56)	6.35 (<.001)	9.22 (<.001)	8.23 (<.001)	8.86 (<.001)

SHS = secondhand smoke; SF = smoke-free; NS = non-significant. Only those who recalled the ad were asked to give their opinions about it. The full sample (N = 1518) were asked about recall of loss-framed ads, but only 1006 were asked about recall of gain-framed due to ad selection in County C. Although there were relatively few missing values for any single variable, only participants with complete information on all variables were included in the mixed models.

Discussion

Recall

Participants recalled a higher percentage of gain-framed ads. This finding is inconsistent with one study reporting that loss-framed antitobacco messages required more processing resources and were more likely than gain-framed ones to influence rural people's attention and memory.[12] One explanation for this discrepancy may be that our gain-framed ads typically contained county-specific elements. Seven of the eight gain-framed ads (88%) contained statistics, pictures, or quotes from residents, while only three of the 13 loss-framed ads contained county-specific information (23%). This may indicate the value of county-specific information in promoting recall of media messages in rural communities. A recent study reported 81% recall of a smoking cessation campaign, including multiple media channels featuring pictures and quotes from local rural residents.[17] In contrast, a national mass media smoking cessation television campaign reported 41.3% recall.[26] After a 3-month print and radio ad campaign promoting activity among rural Arkansas residents with arthritis, 87% of respondents (all with arthritis) were able to recall seeing/hearing at least one ad, but only 11% were able to recall that increased activity was the campaign message.[5] The study reported here used only print ads, which is a typical media channel in rural areas that often have limited resources[5,11,17,27]; however, this may have influenced the relatively low recall rate. In addition, asking about specific ads may have limited recall.

Recall based on frame type varied by age, gender, and education. For gain-framed ads, increasing age was associated with less recall, but there was no relationship between age and recall of loss-framed ads. As age increases, adults may not pay attention to messages that promote the benefits of smoke-free environments. However, adults of all ages may identify with and recall messages focusing on the dangers of SHS. Gender was also associated with recall of smoke-free messages. Males were less likely to recall loss-framed ads, but there was no gender difference in recall of gain-framed ones. Males may not attend to ads focused on the dangers of SHS, but adults of both genders may heed messages touting the benefits of smoke-free air. Use of loss-framed messages to promote smoke-free policy may capture the attention of older women. Whereas, younger age groups and men may attend more to gain-framed messages promoting smoke-free air.

Those with less than a high school education were less likely to recall gain-framed ads, but there was no difference in recall of loss-framed ads by level of education. Messages that portray the benefits of smoke-free air are more likely to attract those with high school education or higher. Media messages expressing the dangers of SHS are likely to reach adults of all education levels. Disparities in effectiveness of media campaigns may be due to lack of exposure to health information among disadvantaged communities.[28] Low-education individuals may gain more information from viewing ads that are new to them. They may perceive these ads to be more effective and show greater attitudinal/behavioral change compared to high-education individuals who may have encountered similar information previously.

Those with greater knowledge of SHS exposure risk recalled a greater percentage of loss-framed ads, but this relationship did not extend to gain-framed ads. Those with more knowledge about this risk may be more likely to identify with and value loss-framed ads.

Effectiveness

There was no difference in response to loss- or gain-framed ads in the percent that liked the ads, would be prompted to take action, or said the ads made them think. However, a higher percentage of respondents said loss-framed ads made them feel emotion, compared to gain-framed ads. Although our study did not assess negative emotion in particular, these findings are similar to previous research, which found that ads featuring serious health consequences of smoking (ie, loss-framed message) were most likely to be rated as high in negative emotion, and this group of ads was most likely to be recalled and perceived as effective.[29] In addition, this finding supports research revealing that serious or negative emotional tone and loss-framing were effective strategies for conveying messages about SHS and smoke-free policies to rural residents.[11]

Whether respondents liked certain ads varied by gender and smoking status. Males liked a smaller percentage of loss-framed ads than females. Not only were females more likely to recall ads about the dangers of SHS, but they also were more apt to like them. This finding is inconsistent with previous research showing no gender differences in liking loss-framed ads.[30] While liking loss-framed ads did not differ by smoking status, smokers liked a smaller percentage of gain-framed ads. Those with greater knowledge of SHS exposure risk and those more supportive of SF workplace policies liked both loss- and gain-framed ads. These ads may have been liked more by those who were particularly attuned to the issue.

Gender was associated with prompting action, causing thought, and evoking emotion. Loss- and gain-framed ads were more likely to prompt action among females relative to males. Gain-framed ads were more likely to be thought-provoking and evoke emotion among females than males. Although females have greater recall and like loss-framed ads, they may be more affected by those that are framed in a positive way. Rural men may be more impacted by "Marlboro Country" and the "Marlboro Man" based in the cultural values of independence, freedom, adventure, and heroism,[1] and may be less responsive to messages that espouse dangers of SHS or benefits of smoke-free air. In addition, more rural men than women are tobacco farmers, and imagery related to the family tradition of tobacco farming is prominent in tobacco industry advertising.[31] Further, gender may moderate the effects of message framing;[32] women who received gain-framed messages were less vulnerable to relapse than women exposed to loss-framed messages, but these differences were not as pronounced in men. Further, issue involvement can alter whether framed messages are persuasive for women or men.[33]

Ad frame effectiveness varied by education, but only for loss-framed ads. Those with less than high school education rated a higher percentage of loss-framed ads as prompting action, thought, and emotion. Race was associated with only one effectiveness indicator for gain-framed ads, and with none of the loss-framed indicators. Minority participants indicated a higher percentage of these ads would prompt action, compared to white respondents. The lack of associations between outcomes and race may be due to little racial diversity in these rural counties, with more than 95% of residents indicating their race as white.

Knowledge of SHS exposure risk and support for SF workplace policy were predictors of nearly all effectiveness indicators regardless of ad frame. Those with greater knowledge and support were more likely to report the ads prompted them to action, thought, and emotion. These findings are consistent with the literature. One study reported that greater knowledge of and belief in the negative health outcomes of SHS exposure is likely to prompt positive attitudes toward smoke-free policies and intention to get involved in smoke-free activism.[24] In a focus group study of rural residents, ads illustrating the grave risks associated with SHS exposure were perceived as more effective in prompting action, communicating associated health hazards, and promoting support for smoke-free policy.[11] There is need for additional research to better understand the demographic and sociocultural factors associated with message framing designed to prompt rural residents to take action for smoke-free policies.

There are several limitations to this study. The sample may not completely reflect the populations in the three counties since females and those with greater education were overrepresented. This concern is somewhat mitigated since the analyses were done using gender weights. We were not able to make comparisons by race due to the small percentage of minority participants, which is consistent with the population demographics in the study counties. The number of study counties is relatively small (though comparable to other media intervention studies). In addition, those with only cell phones were not in the sampling frame unless they were part of a mixed use telephone exchange or had ported their landline number to their cell phone; these results may not be generalizable, particularly to younger adults. Also, since the ad campaigns were designed by county smoke-free advocates without oversight of message frame type, respondents in one of the counties were not included in the gain-frame outcome analysis (their campaign did not include these messages). The post-test only design without follow-up may have overestimated the impact of the ads. Further, while our study followed the convention of prior research and evaluated the effect of knowledge and support for smoke-free policy on ad recall and effectiveness, it may be that ad exposure could lead to increases in knowledge or support; this could not be tested due to the cross-sectional design. Some of the findings may be attributable to other tobacco control efforts on the state and county level, as well as pro-tobacco efforts by the tobacco industry and Kentucky's conservative sociopolitical environment.[34] In addition, media campaign intensity may have been affected by available resources in these rural communities; we were unable to track the total amount of money spent on each ad.

Our results may be challenging to generalize since they are based on the specific ads used. While our analysis centered on framing type, there may be other ad attributes that affect recall and perceived effectiveness. Two measures of perceived effectiveness, namely whether the ad caused thought or an emotional reaction, were measured on a scale ranging from strongly agree to strongly disagree. While this is consistent with prior research, additional studies in this area may benefit from assessing the direction of emotional responses (ie, positive vs. negative). Further, the gain-framed messages used in this study were less focused on the advantages of smoke-free air and instead were related to supporting smoke-free policies; as such, they did not convey information identical to the loss-framed messages. Finally, outcomes may have been influenced by literacy level. Future studies are needed to examine the relationship between literacy level and responses to ads.

Conclusions

Gain-framed ads portraying the benefits of smoke-free air may be more memorable than loss-framed messages focusing on the dangers of SHS. Since the gain-framed ads in this study were more likely to include county-specific information than the loss-framed ones, it

may have been the localized information that also promoted recall. However, the loss-framed messages were more effective at evoking emotion. Both loss- and gain-framed messages have a role in promoting smoke-free policy in rural areas, but the differential advantages of frame type (along with varied impact by demographic characteristic) underscore the need for broad spectrum campaigns to reach different subpopulations. Smoke-free efforts in rural areas may be bolstered by promoting both the benefits of smoke-free workplace policies and the dangers of SHS exposure depending on the target audience. Advocates in rural areas may need to use a variety of ad types and framing strategies to appeal to a wide audience. Further research is needed to test the effectiveness of targeted message frames to promote smoke-free policy in rural communities.

Supplementary Material

Supplementary Appendix can be found online at http://www.ntr.oxfordjournals.org

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Declaration of Interests

None declared.

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